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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Hagen Spies

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EXAMINER

BITAR, NANCY

ART UNIT

PAPER NUMBER

2624

MAIL DATE

DELIVERY MODE

12/09/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/593,448	Applicant(s) SPIES ET AL.	
	Examiner NANCY BITAR	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-16, 18 and 19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16-18-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/30/2009 has been entered.
2. Applicant has amended claims 1. Claims 4, 17-28 have been cancelled. Claims 1-3, 5-16 are currently pending.
3. Applicant's arguments, in the amendment filed 8/31/2009, with respect to the rejections of claims 1-16, 18-19 under 35 U.S.C. 103(a) have been fully considered but are moot in view of the new ground(s) of rejection necessitated by the amendments. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Hsieh et al (US 5,594,767)

Examiner Notes

4. Examiner cites particular columns and line numbers in the references as applied to the claims below for the convenience of the applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested that, in preparing responses, the applicant fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-16, 18 and 19 rejected under 35 U.S.C. 103 (a) as being unpatentable over Peters (US 5,715,334) ET al in view of Hsieh et al (US 5,594,767).

As to claims 1, 18 and 19, Peters teaches enhancing a first CT image composed of a plurality of elements, each element having an intensity value indicative of a tissue type (An "image information enhancement" technique for processing digital images is presented, wherein enhancement of image detail contrast is accomplished by adding a differential hysteresis pattern to a digital image. Column 1, line 57-column 2, lines 38), the method comprising: receiving the first CT image (Ct image, column 30, line 38) , providing, by enhancement processing based on the first CT image, one or more processed CT image (figure 26, column 33, lines 42-column 34, lines 63) , the enhancement processing being performed with respect to at least one predetermined intensity value ranges, and combining the first CT image and the one or more of the one or more processes CT image (high precision hysteresis images maintain all the characteristics of hysteresis lines, i.e., "pixel-accuracy" of preserved intensity components which were larger than the hysteresis range, by maintaining their spatial position and their intensity character, but reducing their individual maximum intensity range by as much as one half the cursor range; column 33, lines 42-column 34, lines 9; note that in claim 1, Peters teaches that the

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differential image data array is added to the first image data array) , whereby an enhanced CT image is provided, the combining being based on a classification with respect to intensity values of regions within at least one of the first CT image and the one or more processed CT image (FIG. 30A shows that a CT cross section scaled to 8-bit image revealed little data. FIG. 30B shows that differential hysteresis image for a large differential hysteresis range of 8-bit improved the overall structural contrasts. FIG. 30C shows that the enhanced hysteresis intensity details reveals details in all tissues, i.e., the liver region showed a dramatic increase of fine structures. FIG. 30D shows an improved image with enriched selected intensity details FIG. 30E shows that the highest contrast resolution hysteresis detail patterns were found below the relatively small noise component (1% IR). Although noisy, the liver fine structure indicated a zoning and ultra structures at the level of single canaliculated and vessels. FIG. 30F shows that an improved image was obtained by enrichment of the spatial hysteresis details, column 36, lines 57-column 37, lines 23; claim 1). While Peters meets a number of the limitations of the claimed invention, as pointed out more fully above, peters fails to specifically teach combining being based on a classification with respect to intensity values of regions within the first CT image and the at least two of the processed image. Specifically, Hsieh et al. teaches method for enhancing image sharpness in images generated from CT scan data by using enhancement masks. The enhancement masks are generated, in one embodiment, by generating difference image data from the original age data and low pass filtered image data. The original image data CT numbers are assigned to image regions, e.g., bone, air, and soft tissue, and based on such CT number classifications, certain data in the difference image is fully or partially suppressed. Subsequent to suppressing some difference image data, the difference image data set, which is sometimes

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referred to as an enhancement mask, is then combined With the original image data to increase image sharpness (see abstract and figure 1; column 3 lines 14-65). It would have been obvious to one of ordinary skill in the art to increase image sharpness and decrease the level of aliasing artifacts without reducing overall image quality. Therefore, the claimed invention would have been obvious to one of ordinary skill in the art at the time of the invention by applicant.

As to claims 2-4, Peters teaches receiving an indication of the at least one predetermined value ranges and associating the at least one predetermined intensity value ranges with the one or more processed CT image (note that in figure 26, it is clear that a plurality of processed copies of the first CT image are generated wherein the differential images with different scaling are interpreted as one image see figures 30A-F.) Moreover, Peters teaches the enhancement processing is adaptive to a local structure defined by at least one of the plurality of elements and the local structure is defined by a group of elements whose intensity values are within the at least one predetermined intensity value ranges (a novel method of image information analysis and classification based on the concept that any image communicates information only through image contrasts which are intensity variations between certain pixel arrays within the total data matrix. An area of certain contrast is defined by the differences between its average intensity and the surrounding intensity irrespectively of the overall intensity variations (background). The new detail filter of this invention provides the only tool available for selecting such local intensity variations independently from the other intensity variations within the full data matrix through only one parameter which is the intensity range (equal to cursor width or significant intensity range) ; column 7, lines 1-6 ; see also Hsieh et al figure 2 element 20).

As to claim 5, Peters teaches the method of claim 1, wherein the enhancement processing comprises applying a non-linear filter to the one or more of the processes CT image (The smoothing technique of this invention comprises a two dimensional digital hysteresis filter which utilizes a variable, automatically adjusting "two-dimensional mask". As a result, the filter is independent of the image size and content and cannot alter the size of any structural (significant intensity) features, even if they are as small as only one pixel in size, column 3, lines 46-60; see also Hsieh et al column 5 lines 1-14) .

As to claim 6, Peters teaches the method of claim 1, wherein the enhancement processing at least one of a noise reduction using a low pass filter, a contrast enhancement using unsharp masking, a rank filtering, an adaptive filtering, a mean-shift filtering, a variation method, a multiband technique and a wavelet technique (In general, "detail enhancement" refers to an enhancement of the contrast of image details and must include the spatial details as well as the intensity details in order to maintain the image character (image accuracy), column 5, lines 10-43).

The limitation of claim 7 has been addressed above.

As to claim 8, Peters teaches the method of claim 7, further comprising prioritizing the first CT image and one or more of one processed CT image, whereby an element of a CT image having a higher priority is included in the enhanced CT image and a correspondingly located element of a CT image having a lower priority is excluded from the enhanced CT image (figure 6; column 31, lines 42-column 32, lines 64).

As to claim 9 and 10, Peters teaches smoothing and normalizing the region masks (smoothed images, column 17, lines 32-column 18-lines 41).

As to claim 12, Peters teaches method of claim 1, wherein the first CT image is selected from one of a two-dimensional array, a three-dimensional array and a four-dimensional array (digitized image data array comprises a multi-dimensional data array, claim 16)

The limitation of dependent claims 11-14 has been addressed in column 14, line 65-column 15, lines 62 and column 33, line 42-column 34 lines 63)

Claims 15-16 differ from claim 1 only in that claim 1 is a method claim whereas; claims 15-16 are carried in a computer medium. Peters teaches the implementation of the image information enhancement technique in a computer program (column 17, lines 30-59). Thus, claims 15-16 are analyzed as previously discussed with respect to the claims above.

The limitation of claims 18-19 has been addressed in claim 1 above.

Contact Information

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to NANCY BITAR whose telephone number is (571)270-1041. The examiner can normally be reached on Mon-Fri (7:30a.m. to 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nancy Bitar/
Examiner, Art Unit 2624

/Wes Tucker/
Primary Examiner, Art Unit 2624